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ABSTRACT

The authors suggest that children with severe language deficits can best learn to spell using a nonvisual (blindfolded) multisensory technique based on tactile recognition using the nondominant hand. A procedure known as Hemispheric Routing or the VAKT (visual, auditory, kinesthetic, tactile) method is explained. As a first step in remediation, the handicapped child is blindfolded, thus eliminating the overloaded, or at least noncontributing, modality. The student's first contact with a word takes place through touching three dimensional letters which can either be named or sounded. The letters are then felt and traced, thus utilizing the kinesthetic and tactile modalities. The word is considered learned when it is correctly written by the student with his eyes shut, with eyes open, and ultimately identified in a text. Use of the method in several subjects is cited. (SBH)

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MULTISENSORY TECHNIQUES UPDATED: FERNALD AND GILLINGHAM TO HEMISPHERIC ROUTING

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INTRODUCTION

TV Child Seen As Requiring Special Methods Learns Spelling, Blindfolded

Declaring that the TV child is different from children before him, Dr. Blau, educational consultant, and Dr. Loveless, psychologist, state that only a beginning has been made towards developing the new teaching methods he needs. One example is their new method for teaching spelling which utilizes recent research findings regarding brain function.

For years, they point out, spelling skills have declined steadily despite every effort to get kids to look and remember. The new technique does exactly the opposite, saying in effect, "Don't look until you're ready." The fingers of one hand and three-dimensional letters are the chief tools of the new technique which concentrates learning, at first, in one hemisphere of the brain. Then the words are given back to the eyes for normal inspection but the letters are upright as they usually are on the TV screen.

Reporting to the 17th Annual International Conference of the Association for Children with Learning Disabilities in Milwaukee, Doctors Blau and Loveless described current practice in teaching spelling as visual, first, then auditory, and sometimes tracing and touching. Their new method turns this completely around so that tracing and touching are first and TV style seeing is permitted only at the end.

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Part I

The field of dyslexia and other learning disabilities has been marked by a long history of the study of prominent symptoms in reading, writing and spelling and of modality specific remedial techniques. The treatment of reading, writing and spelling disabilities has remained a challenging problem to the current day despite the pioneering efforts of Gillingham and Stillman, Fernald Blau and Childs. This paper is aimed at an exposition and examination of a promising innovation in teaching spelling to a group of severely impaired learners using a tactile-visualization technique.

From the early concepts of cerebral dominance and strephosymbolia (Orton 1937) issues of cerebral dominance, and more recently hemispheric specialization, have frequently been used to explain dyslexic symptoms (particularly errors due to the disorderly recognition of letters and syllables in a word). The symptom specific issue of dyslexia has frequently led to the search for identifiable subgroups of dyslexic and learning disabled children. The "ideal" group of children would clearly represent the operation of only one or two other sets of symptoms hypothetically related to an area of cerebral specialization and thereby "prove" the theory and yield to an effective therapeutic method. The focus of our concern is currently on the relationship between hemispheric specialization and spelling ability. These are children with poor language abilities and better practical and applied skills.

Kinsbourne has attempted to reconcile many of the issues of cerebral localization by proposing a model of how mental functions are organized in the brain. He calls his formulation the "functional cerebral distance model." In this model, functions which are similar are close in distance, while, unlike and unrelated functions are distant. Distant and unrelated functions work against each other when performed simultaneously, while those close in cerebral distance augment each other.

Kinsbourne states his notion as follows:

> In other words, if you ask the subject at the same time to do the same thing with two separate output organs, the model predicts better performance if their cerebral representations are juxtaposed in functional cerebral space. But uncorrelated tasks are best done if the loci in question are far apart.

The implications of Kinsbourne's model for the treatment of dyslexia and other learning disabilities is to favor the augmentation of the strongest hemisphere or most intact ability in the disabled child. For children for whom there is a conjectured lateralization of disability this implies keeping any training focused on the child's strongest hemisphere. The pertinence of this notion is strongest for multisensory and multi-modal methods, where the clearly separated tactile and auditory procedures are being processed simultaneously. The technique we advocate emphasises visualization andkinesthetic recall in place of solely phonic cues.

Blau and Loveless (1978) have refined Blau's original AKT method (Blau 1968) with an eye towards capitalizing upon the hemispheric augmentation implied by Kinsbourne's model by using solely left handed tactile recognition of stimulus letters for children with language deficits where the right hemisphere functions are intact. It would seem from Kinsbourne's review of the research that either hand would stimulate the desired outcome, but that concurrent effects arise best from contralateral hand and hemispheric processing.

According to Kinsbourne

> Concurrent effects arise in dual task performance. In this paradigm we give the subject, at one and the same time, two things to do. The model predicts that if the two tasks are correlated or similar to each other, then the closer together their control centers are in functional space, the better they are performed. In fact, looking into the literature we find an interesting premonition of this sort of finding, in the form of three studies by Cook in the 1930s. He exercised one limb and measured transfer of skill to each of the other three limbs. He found the most transfer to the mirror image limb (arm to arm, leg to leg) and the least transfer to the obliquely removed limb which is furthest away from functional space. For a message to travel from the control center of one arm to the other leg or vice versa, it must cross from hemisphere to hemisphere and also be conducted along the motor cortex in some way.

The application of the principle of "cerebral distance" to capitalize upon intact unihemispheric functions and to facilitate the "simultaneous transfer" of information within a hemisphere is a new rationale for the use of the AKT method. This is the goal of our research investigation. In particular, we are interested in the use of this principle to facilitate the development of decoding and spelling skills of dyslexia children with selective deficits. Kinsbourne's formulations may further cast light on previous failures to demonstrate selective benefits with one or another method when applied to undifferentiated populations of "poor readers." The growing awareness of the complexities of dyslexia and the learning disabilities suggests a need for increased precision in diagnosis and selectivity in the application of instructional methods to children classified under these rubrics.

To summarize we suggest that, children with severe language deficits can best learn to spell using a non-visual (blindfolded) multisensensory technique based on tactile recognition using the non-dominant hand.

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Part II

It is the theme of this paper, that we are on the verge of a substantial redefinition and expansion of the concept of multi-modality or multi-sensory instruction to include the neurological structure of the brain. In the beginning there was dyslexia, that challenging malady that has been a kind of stalking horse for the whole field of remediation. It was a recognized syndrome long before a special reading class existed. It was no accident that Orton pioneered the theory that remedial techniques had to be based on some assumed principle of brain dysfunction.[1] This lead to the development of what is currently known as the Gillingham method[2] based on phonetic analysis rather than whole word recognition. The latter method describes the visual identification--auditory matching process, and the superficial, non-analytic fashion by which words seem to be learned.

The other major contribution of the Gillingham method is the emphasis on the kinesthetic modality or the perception of feeling in the muscles of the speech organs and hand when producing the word. Writing thus became an important part of the learning-to-remember-by-association process. It was very much different from the familiar assignment given by teachers from time immemorial to "write the word ten (or twenty or more) times each." An even more relevant but faint precursor of what was to become "modality blocking" is found in Gillingham's suggestion that words be mastered with "eyes averted."

This VAK (Visual, Auditory, Kinesthetic) method was soon expanded to what is now known as the VAKT method.[3] Fernald added the tactile modality by having the child trace the word to get the "feel" of it before proceeding to use it in writing and reading. Nearly all those involved with the LD child are aware of these two methods and the many variants which have been developed. Our innovative procedure subsumed under the phrase "Hemispheric Routing" was developed to serve a population the diversity of which was unknown at the time of the development of the Gillingham and Fernald procedures, and to provide a more adequate prescriptive method of intervention. Four modalities thus constituted the somewhat grandiose phrase "multi-modality" previous to this.

This new technique had its beginning in the accumulation of data concerning the so-called "minimally brain damaged" child.[4] It was based on Myklebust's suggestion that by presenting "interrelated functions such as both auditory and visual learning" simultaneously, "a breakdown in neurological processes occurs...," a kind of overloading that could explain "confusion, poor recall, random movement, disturbed attention,..."[5] paradoxically generated by well-meaning attempts at remediation.

"Modality-blocking" which also came to be called "non-visual AKT" had originally developed out of Myklebust's suggestion becoming the fifth modality approach to the problem.[6] Blau and Blau went along with the astute parent of the handicapped child who could have said, if she did not actually do so, "He learned to talk; why can't he learn to read?" Some could have been more direct, and challenging the teacher with, "I did my part; why don't you?" This challenge from parents continues to confront us, if not to confound us. Blau and Blau concluded that obviously the auditory-vocal integration skills were effective, but that the visual-motor skills appear as a continuously disruptive factor in the acquisition of the sound-symbol relationship. At fourteen or forty, as any dyslexic demonstrated, it was apparent that merely looking, using the visual-motor mechanism, was not sufficient for learning.

As a first step in remediation, therefore, the handicapped child or adult was blindfolded. The overloaded, or at least non-contributing modality was thereby eliminated in the initial stages of remediation. The student's first contact with the word took place through touching three-dimensional letters which could either be named or sounded. The letters were then felt and traced thus utilizing the kinesthetic and tactile modalities. The word was considered learned when it was correctly written by the student with his eyes shut. It was then written with his eyes open several times and ultimately identified in a text. Thus VAKT was reversed, becoming TKAV.

The method was applied to a wide variety of language disabilities in a urban setting. Success was often forthcoming after other frustrating

attempts at fostering achievement. Case histories continued to be the most significant evidence of the effectiveness of this technique. Prior research, however, had indicated that no method could claim measurable superiority as a panacea for all spelling ills. Nor did any research or theory of brain function address itself to the fact that a far greater number of males were language impaired.

In 1970, investigation began into the educational use of the right hemisphere of the brain. This was the basis of the sixth extension of the multi-sensory method, "Hemispheric Routing", in an attempt to fit a remediation technique to the locus of neurological deficits in the child. The data which had been accumulating in the 1970's seems to deal primarily with hemispheric specialization and localization of function. We find general agreement on left versus right brain specialization; linguistic, sequential, logical, temporal processes versus non-linguistic, spatial, simultaneous, patterned behavior. There is generally, of course, an appropriate caution that hemispheres are not independent entities. There is a shift in specialization of function when it is necessary. The fully expanded concept is that our schools are oriented towards the mastery of materials suitable to processing by the left hemisphere. That is, we have left brained schools in which left brained individuals excel.

This has led serious consideration of training for those not so fortunate. One author suggests:

> Without practice, skills and processes can become stagnant so the comfort of using the dominant hand (or brain) often results in subordinate hand (or brain) getting minimal use. As a result, the ineptitude which results from a lack of practice is often incorrectly interpreted as lack of inherent ability.[8]

Alan Kaufman, who collaborated with David Wechsler during the revision of the WISC, stated as recently as December 1979 his opinion that LD children, including dyslexics, are right brain learners.[9] He did not recommend practice as a remedial procedure. Professor Masland was even more specific in attributing pattern recognition in written language to the right hemisphere.[10] He did not recommend practice either.

However, those of us whose problem is remediation have no choice but to try.

Finally, we must note that an elaborate and complex research into right hemisphere specialization among dyslexics has been conducted over a period of five years and is still in process. Among the extremely interesting findings were those dealing with "Dichotomous Tactual Stimulation with Nonsense Shapes." [11] This means that a different shape was placed in each hand of a group of normal, right handed boys, and a group of dyslexic boys. They were then asked to identify the shapes they had felt from a visual display. The normal group showed a predicted greater accuracy for left hand shapes, clearly indicating right hemisphere function; the dyslexics did not.

Concerned as we are with methodology relating to spelling, word recognition, and ultimately reading, two experiments were initiated. The first concerned two dyslexics, both male. One was nineteen years old and a diagnosed dyslexic at age seven. He is subject A on the graph which you will be able to pick up as you leave. His IQ was taken as average and he had managed to be awarded a minimal competency high school diploma. He was right handed. He could spell but very poorly.

The other subject was sixteen years old, non-white, somewhat slender and undersized for his age. He is subject B on the graph. His IQ was taken as dull normal. He had been excluded from a conventional school at age eleven. He functioned on about a fifth grade level and was virtually a non-speller. He was left handed and behaviorally explosive when not medicated. He attended a special school. Starting with zero mastery on lists deemed suitable to their intellectual ability, both subjects improved to about the 80% level in very few sessions. The virtual equivalent gains in their first post-tests were not seen as significant. Later tests showed the steep drops expected in rote learning.

What interested us was the neatness with which "non-visual AKT" or "Modality Blocking" fitted into our experimental needs, for routing otherwise stubborn spelling words directly through the left hand into the right hemisphere as simple configurations. Then hopefully, these would be mediated in the left hemisphere, and permanently retained. Previous use of this non-visual technique had made use of both hands simultaneously with mixed results. Now it promised to be both hemisphere and sex specific.

We were now aware that in terms of the new data, the non-visual phase was clearly blocking off a bilateral cortical function. Only the left hand was used to manipulate, trace, and feel the three dimensional letters and we anticipated specific consequences. Not only would spelling patterns be "engrammed" directly but the motoric facility so often noted in linguistically handicapped individual could now be put to use with even a possible spin-off in the shape of improved self-concept. We are not unaware that attempting to influence brain function by moving parts of the body goes back to the theories of Delacato[12], Kephart[13], Barsch[14] and others.

The second experiment involved children not very much different from subject B. They were handicapped by severe spelling and other learning disabilities, and attended a special school also. The experimental design varied somewhat. Out of a bank of twenty misspelled words for each student five were spelled with one hand and five were spelled with the other hand. As nearly as could be arranged, each student subject began with the hand opposite to the one who preceded him. This experiment is still in process.

In conclusion, we have seen the extension of the multi-modality, multisensory technique from four to six when all of recent research is properly utilized. Still in its beginning, Hemispheric Routing offers another and as yet unexplored avenue towards non-invasive modification of brain function once known simply as education.

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